

# Summer Outlook 2012

Southeast Lower Michigan

A world map is visible in the background, rendered in a dark blue and black color scheme. A light gray grid of latitude and longitude lines is overlaid on the map. The map shows the continents of North America, South America, Africa, Europe, and Asia.

**Summer Outlook  
June through August  
2012**

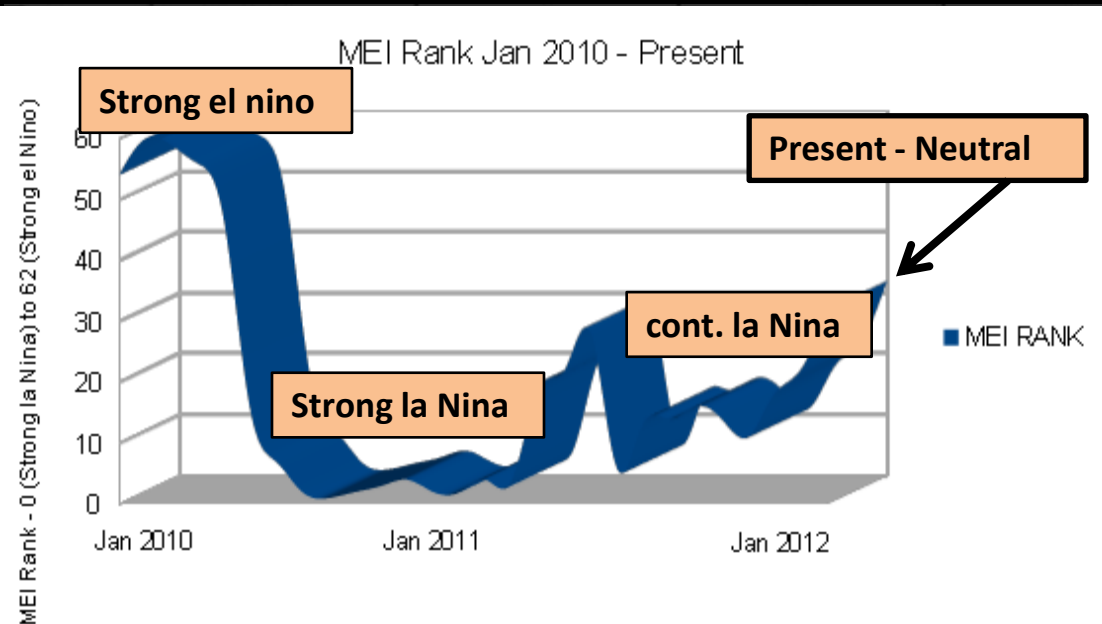
# Summer Outlook 2012

## Southeast Michigan

- ENSO Discussion (Past, current, and forecast states)
- Argument for persistence (a continuation of recent trends)
- Summer Outlook for Southeast Michigan

# ENSO Discussion

## Past, Current, and Forecast States



MEI rankings are provided by the Physical Sciences Division [here](#).

“El Niño/Southern Oscillation (ENSO) is the most important coupled ocean-atmosphere phenomenon to cause global climate variability on interannual time scales.” ([ESRL/PSD](#))

Seasonal forecasts almost always start and end with the ENSO cycle. It is the strongest and most easily predicted mechanism to influence the climate on a seasonal time scale.

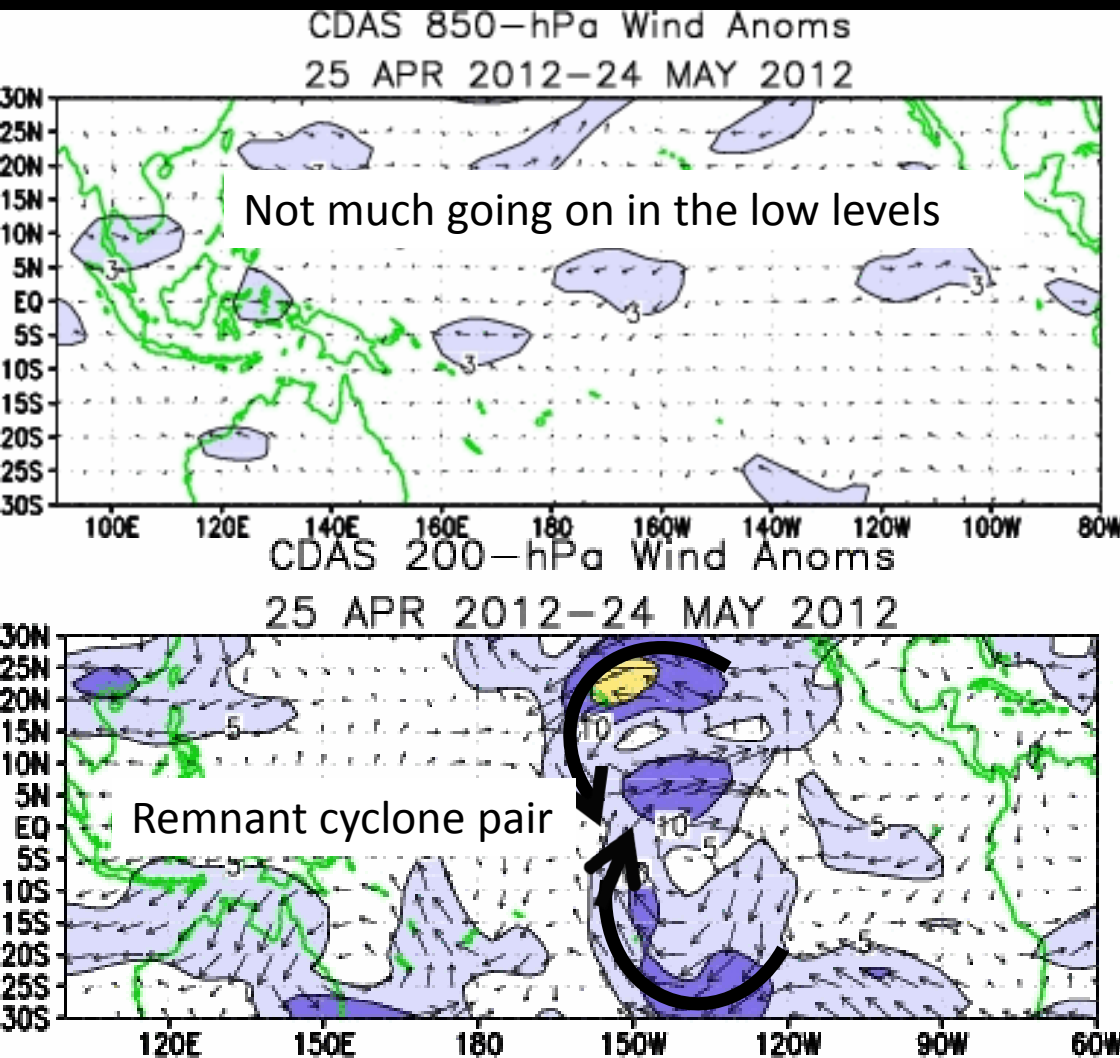
**Left:** “Multi-variate ENSO Index” or MEI rank since January 2010. The MEI is a more holistic approach to measuring ENSO than using sea surface temperatures alone.

After descending into a strong la Nina in the middle of 2010, we have gradually worked our way back toward normal.



# ENSO Discussion

## Past, Current, and Forecast States



**Left:** Low-level wind anomalies in the tropical Pacific

There is no coherent signal for easterly wind anomalies, indicating that the tropics have begun a return toward normal.

**Left:** Upper-level wind anomalies in the tropical Pacific

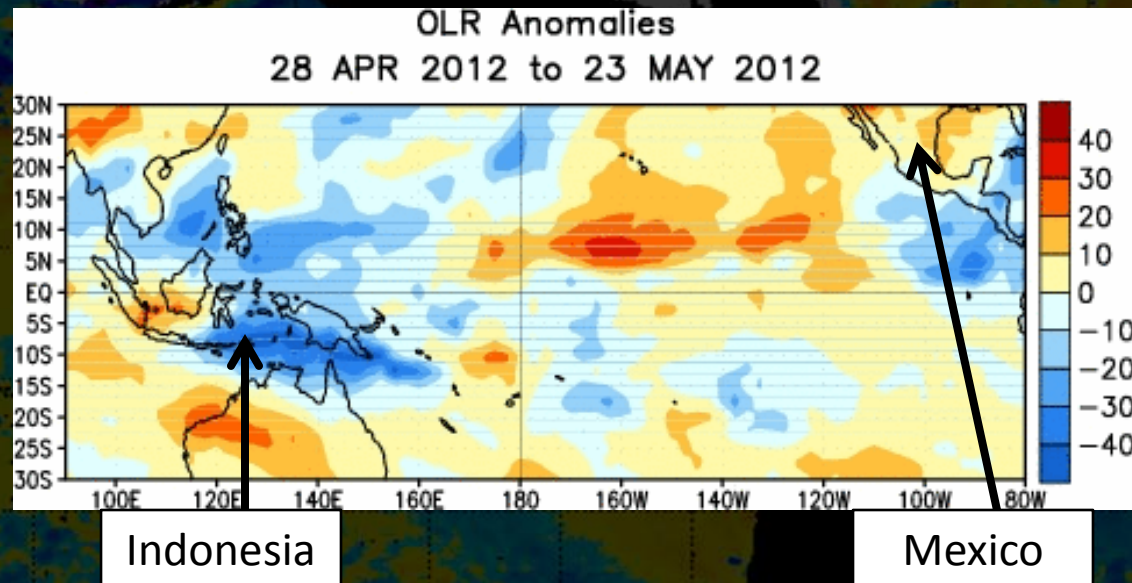
Black arrows indicate an upper-level cyclone pair along the equator. This is a remnant of la Nina, and suggests that the tropical circulation is still “spinning down”, and will return to normal sometime in the next several weeks.

# ENSO Discussion

## Past, Current, and Forecast States

**Right:** Above normal thunderstorm activity (blue). Below normal (red).

Thunderstorm activity is still displaced over the west Pacific, characteristic of la Nina, so there may yet be some lingering forcing for our weather in the mid-latitudes in the shorter term.



# ENSO Discussion

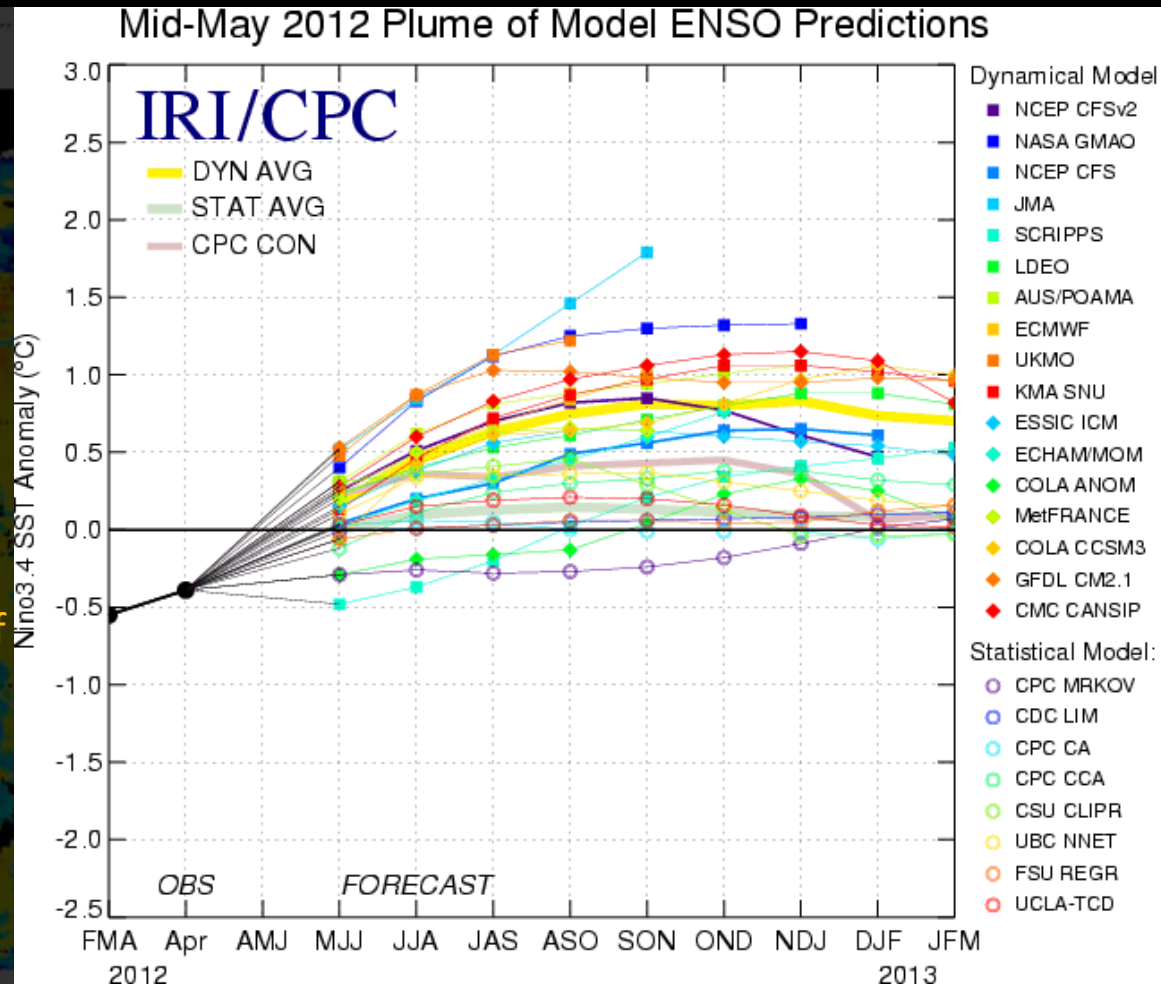
## Past, Current, and Forecast States

### Right: ENSO model plume

There is a strong consensus that *la Nina* is over. By the end of the JJA (June, July, August) period, many of the models indicate anything from a positive neutral state to a weak *el Nino*.

Either way, the tropics will slowly warm and will head in the direction of a weak *el Nino* this summer.

When the ocean temperature changes, tropical weather will follow. We can use that glean some insight into how summer might end in SE Michigan.





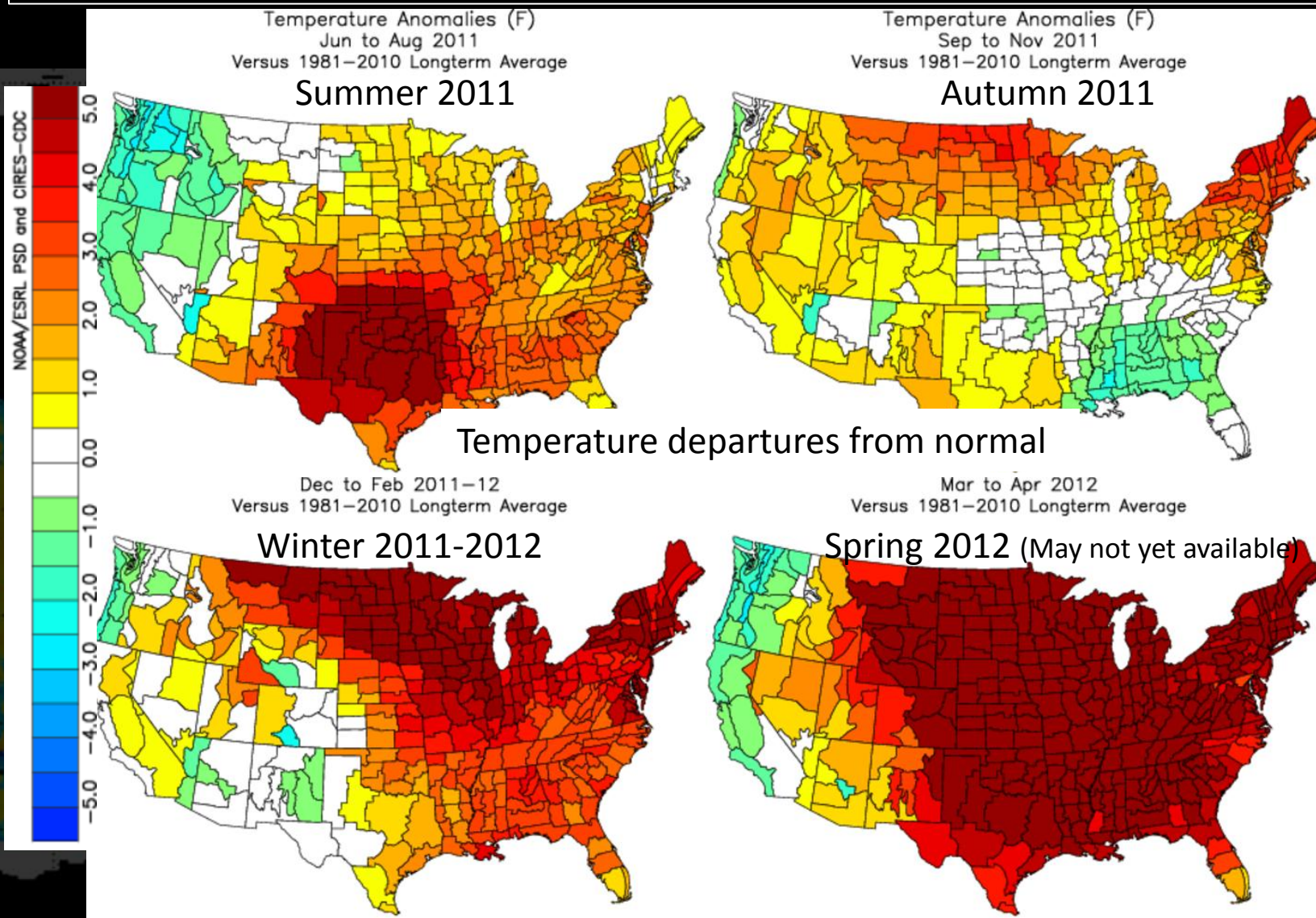
# Argument for Persistence

The trends have been steadfast, so why change what's working?

- Flint has been warmer than normal for 14 straight months, dating to April 2011.
- Detroit has been warmer than normal for 13 straight months, dating to May 2011.
- They are not alone (coming up).
- In many cases, the warm anomalies have not been small...
  - The **March 2012** heat wave was the most unusual climate event to ever be recorded in Southeast Michigan.
  - More all-time records fell in **May** en route to **Spring 2012** being the warmest on record.
  - **July** of last year was the hottest month that Detroit has ever recorded.
  - Recall the **non-winter of 2011-2012** which saw below normal snowfall and much below normal snowpack.

# Argument for Persistence

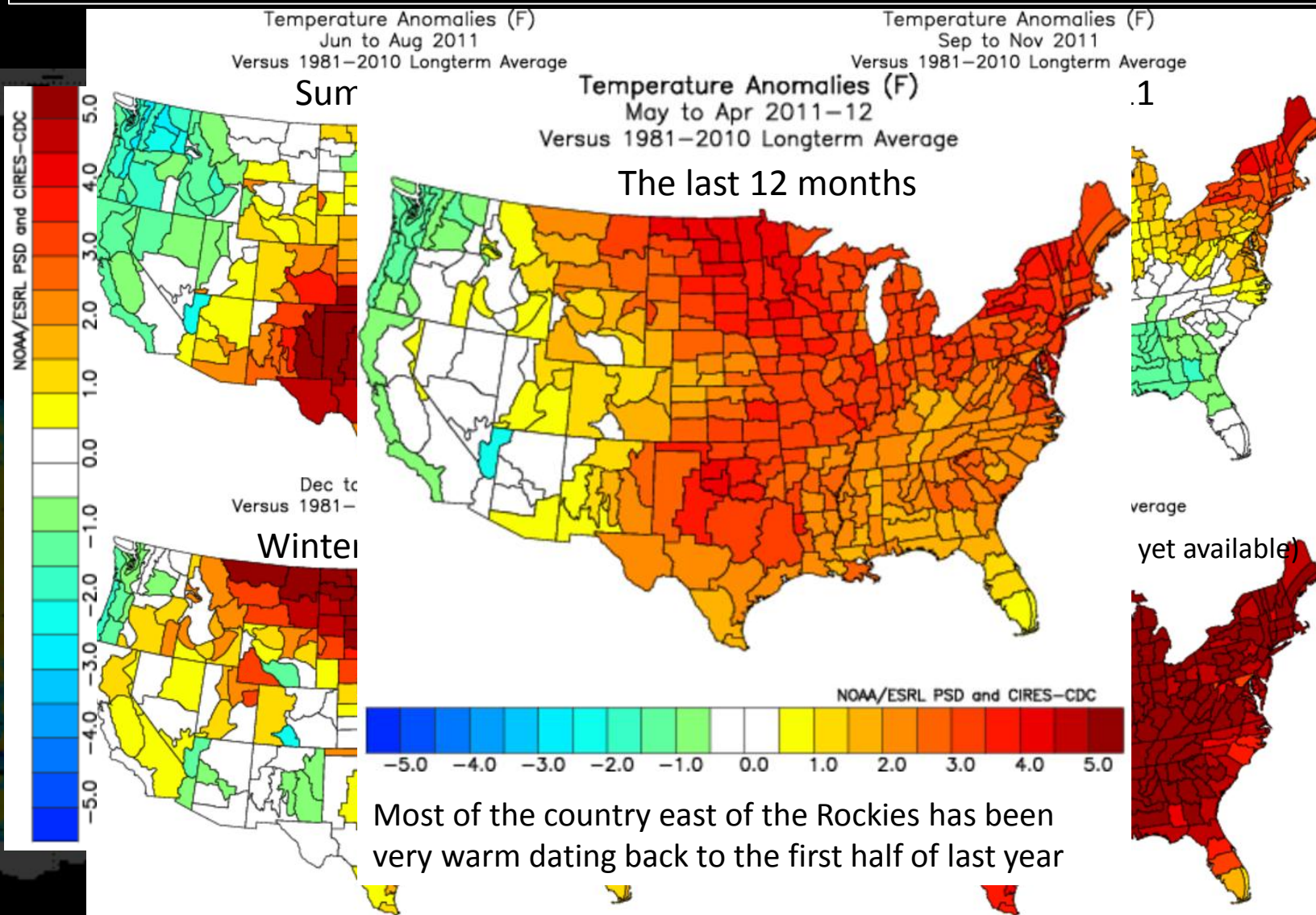
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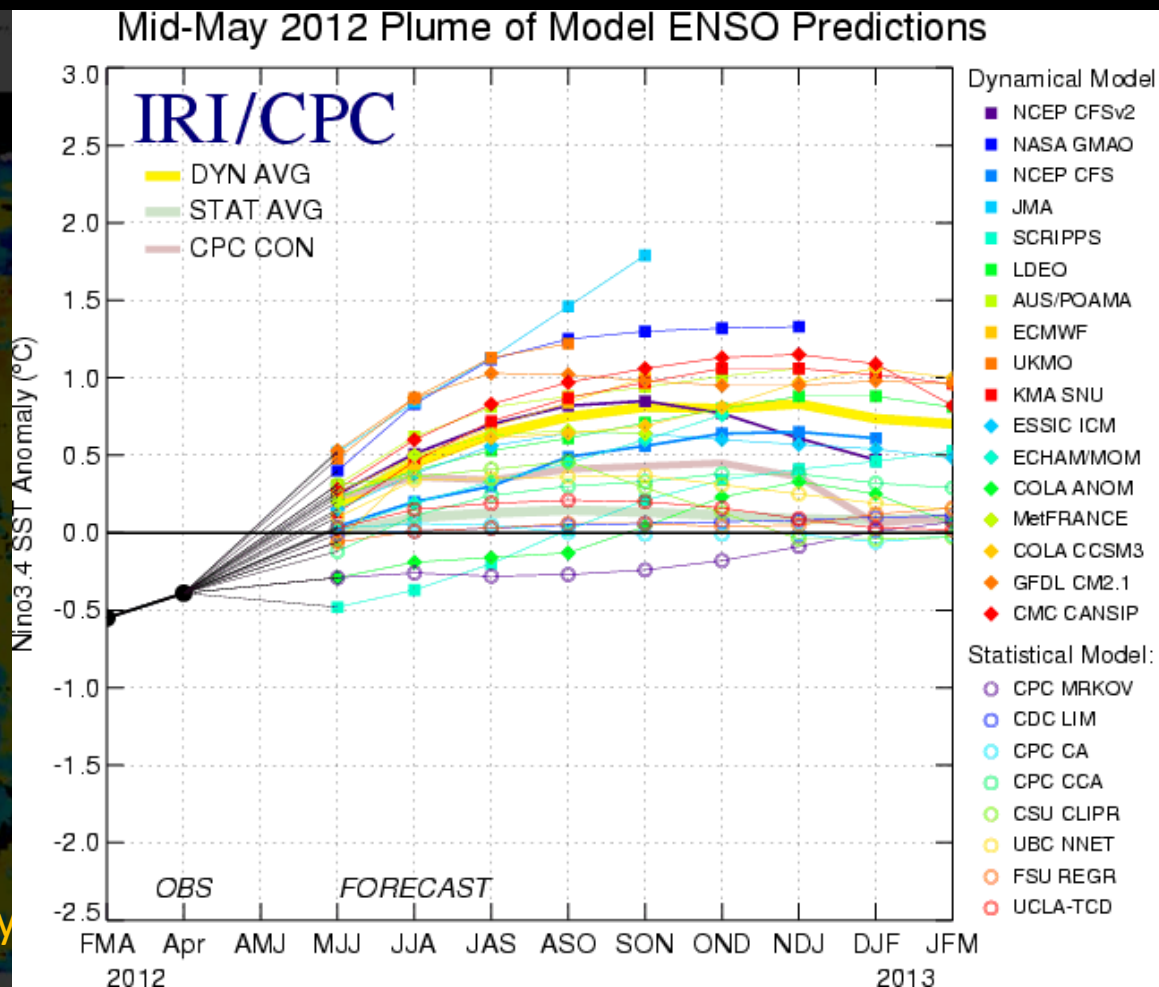
If nothing has changed, why change the forecast?

**Right:** ENSO model plume (again)

The unusually long duration of warmer-than-normal temperatures provides higher-than-normal confidence in continuing the trend into the summer despite the chilly start to June.

Will the warming tropics, the only “known” factor for this summer, be enough to alter the pattern?

El Nino affects our weather through heat and momentum transports, which are weak in the summer. So any *substantial* effects will probably be delayed until later in the season.





# Summer Outlook for JJA 2012

## June-July-August

### Temperature Trends

**First 60 days (June-July): Warmer than Normal.** There is no apparent reason to buck the warm trend, despite a below normal start to June. The forecast is therefore one of persistence.

**Last 30 days (August): Slightly Cooler than Normal.** The warming tropical Pacific will cause the trades to weaken and allow convection to begin expanding eastward. This is not the only factor, but it is one of the few “knowns” and it is always important. The jet stream stream response over the central/east Pacific could result in temperatures over Southeast Michigan taking a step down toward the end of summer. This gives a chance for what would be the first below normal month in nearly 1.5 years.

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### Precipitation Trends

**Summer (June-July-August): Near normal.** Warm season rainfall (thunderstorms) is hard to predict over the course of a season. A warm forecast usually lends itself to a drier one as well, but the signal is not strong enough to warrant a dry forecast. The prospects for a mild strengthening of the Pacific jet could lead to an uptick in rainfall during the last 30 days of summer. Final figures should be near normal.



# Summer Trivia for Southeast Michigan

**Warmest temperature:** Tri-Cities: 111F (7/13/1936), Flint: 108F (7/13/1936), Detroit: 105F (7/24/1934)

**Warmest month:** Tri-Cities: 77.5F (Jul 1921), Flint: 78.0F (Jul 1921), Detroit: 79.3F (Jul 2011)

**Warmest summer:** Tri-Cities: 73.3F (1933), Flint: 74.2F (1933), Detroit: 74.8F (2005)

**Coldest temperature:** Tri-Cities: 33F (6/8/1949), Flint: 33F (6/4/1998), Detroit: 36F (6/11/1972)

**Coldest month:** Tri-Cities: 60.6F (Jun 1982), Flint: 60.1F (Jun 1969), Detroit: 62.8F (Jun 1985)

**Coldest summer:** Tri-Cities: 64.8F (1915), Flint: 65.4F (1992), Detroit: 66.5F (1915)

**Wettest month:** Tri-Cities: 9.04" (Aug 1995), Flint: 11.18" (Aug 1937), Detroit: 8.76" (Jul 1876)

**Wettest summer:** Tri-Cities: 16.28" (1928), Flint: 18.39" (1937), Detroit: 16.96" (1896)

**Driest month:** Tri-Cities: 0.27" (Aug 1927), Flint: 0.16" (Jul 1939), Detroit: 0.16" (Aug 1894)

**Driest summer:** Tri-Cities: 3.54" (1927), Flint: 3.76" (1930), Detroit: 3.58" (1911)

**Average first 90 degree temperature:** Tri-Cities: Jun 17<sup>th</sup>, Flint: Jun 18<sup>th</sup>, Detroit: Jun 19<sup>th</sup>

**Climatological chance of reaching 100 degrees:** 13-14% or once every 18-20 years.